2006 Annual Report
of the
Advanced Technology Program
Advisory Committee

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I. Introduction

The ATP Advisory Committee is comprised of prestigious individuals from industry, academia, and nonprofit organizations with an interest in and knowledge of issues related to advanced technology and economic development. Its charter can be found on ATP's website at: www.atp.nist.gov.

The Committee acts in the public interest to

- Provide advice on ATP programs, plans, and policies
- Review and critique ATP evaluation efforts
- Assess the degree of success of ATP in achieving its legislatively mandated mission
- Function solely as an advisory body, in accordance with the provisions of the Federal Advisory Committee Act

The November 2006 Advisory Committee meeting had to be rescheduled for January 30, 2007. The two meetings covered by this 2006 annual report are:

- May 9, 2006
- January 30, 2007

Each meeting consisted of public sessions during which ATP personnel briefed the Committee on plans, accomplishments, concerns, and issues. In addition, as noted in this report, the Advisory Committee often heard from outside experts in science and technology policy.

The meetings also included brief closed sessions during which budget and personnel issues were discussed and the Committee's recommendations were formulated. Following each meeting, minutes were prepared and posted on the ATP website. During, and at the conclusion of each meeting, the Committee provided feedback and advice to ATP and NIST management.

The Committee has found the Advisory Committee meetings to be intellectually stimulating. NIST and ATP are receptive to advice. The Committee members feel that they have been able to contribute to further improving an already excellent program.

The section that follows (Section II) documents the Committee's findings and recommendations. Section III summarizes the two meetings that have taken place during this reporting period. The Appendices provide information on ATP evaluation reports published since the last annual report.

II. Findings and Recommendations

Findings:

1. The Committee believes that the ATP continues to be an exemplary program. Its success in accomplishing its mission has been well documented. The Committee was deeply distressed to learn that the program is being phased out, and hopes that a way can still be found to continue the program, or at least to capture some of its best features in a new program that would retain the most successful elements of the ATP.[*]

2. The Committee commends NIST Director, Dr. Jeffrey, for phasing down the program in a manner that has avoided a reduction in force action and has strived to minimize adverse impact on its staff. The Committee particularly commends ATP Director Stanley and Deputy Director Wisniewski for their success in maintaining high staff morale during the difficult phase-down period.

3. ATP's efforts to reach out to states in recent years are commendable. The developments described during the January 2007 meeting about how ATP has provided advice and assistance to the state of Texas is a good example of this outreach.

4. The presentations we heard this year suggest that government-industry-university partnerships are increasingly in favor. Other government agencies, such as NIH, are using such approaches successfully. It is most unfortunate that ATP − a federal program that has been particularly successful in fostering government-industry partnerships, and has served as a role model for other agencies to do likewise − is not continuing.

5. Imitation is the sincerest form of flattery. The fact that a number of other nations have made concerted efforts to study the ATP and to implement programs similar to it suggests that ATP has become a model of how government can stimulate high-tech industry.

6. The federal government has been less aggressive in promoting technology in recent years, and the states are playing a proportionately larger role. Rather than compete with each other to lure high-tech industry through tax breaks, at least some states are realizing that it is more effective to stimulate the creation of new high-tech companies and to nurture those that already exist. It seems likely that more states will try to do likewise as they increasingly come to appreciate the validity of this approach. The corporate memory contained within ATP can aid in these efforts.

Recommendations:

1. Every effort should be made to find a way to "resurrect" this successful program.

[*] Since the ATP Advisory Committee prepared this report, Congress provided ATP with $79 million under a Fiscal Year 2007 Continuing Appropriations Resolution. ATP announced a competition on April 4, 2007, and anticipates making approximately 60 awards by late September.

2. In addition to monitoring and managing ongoing projects during the phase down, ATP must continue to strive to document and capture its procedures and "lessons learned" so that future programs might benefit from its experience.

3. NIST should find ways for ATP personnel to provide consulting services to other federal and state agencies that might benefit from incorporating ATP techniques into their operations, particularly, the economic assessment tools and the operation of selection boards. ATP has already established ties with the National Governor's Association. Through these ties ATP expertise could be disseminated to federal and state technology agencies.

4. Even though ATP may not have funding available for new competitions, NIST should explore whether ATP's expertise could be utilized to partner with other agencies dealing with technical challenges. ATP-like efforts could be applied to national problems via thematic competitions. For example, ATP could work with DOE to reduce carbon emissions and develop alternative energy, with NIH to develop technology to fight disease, or with Homeland Security to address their technology challenges. ATP has the legal authority to run competitions with other agency funds, and opportunities for doing so should be explored.

5. Attempts to restructure the program such that both the Administration and the Congress can endorse it enthusiastically have been unsuccessful to date. Aggressive steps should be taken to explore whether a revised program might be designed that *would* be supported by both. This would certainly involve considering a new name, and re-examining the respective roles of NIST and partnering organizations in the program, including:

- large corporations;
- small corporations;
- universities;
- states; and;
- national labs.

More involvement of states and universities in such a revised program might lead to broader support. Whereas universities and national laboratories are invaluable partners in many ATP projects, the Committee cautioned again that the culture or climate of research laboratories of these institutions may work against the sense of urgency and the use of industrial technology development management techniques required for rapid commercialization. Thus, policymakers should take a hard look at proposals calling for those entities to lead projects. Whenever this subject has come up, the Committee has stressed that the purpose of ATP must be to get technology into the marketplace *quickly.*

III. Summary of Committee Meetings

May 9, 2006 Meeting

Dr. William Jeffrey – NIST Director

Dr. Jeffrey welcomed the attendees, thanked the panel for its help, and commented on the interesting agenda and the speakers' backgrounds. (Lewis Branscomb is a former director of the National Bureau of Standards, and Frank Vargo is a former Department of Commerce official.)

For FY 2006, about $80 million was appropriated for the Advanced Technology Program, but the Administration made a decision to begin to phase out the program. The President concluded that while ATP has been well managed, other programs have a higher priority during a time of tight budgets. All ongoing awards will be honored. ATP will continue to manage ongoing projects carefully. A critical task during the phase-down period is to document lessons learned, and Dr. Jeffrey asked the panel to share its views on how best to do that.

Mr. Marc Stanley – ATP Director

Mr. Stanley thanked Dr. Jeffrey for his support and encouragement during this difficult period. Mr. Stanley was especially grateful that NIST has done all it can to provide flexibility in helping ATP staff deal with the situation, for instance, by extending early retirement and buyout options.

Two essential features of the phase-down plan are:

1. Ensure that ATP continues to meet all legal and fiduciary responsibilities associated with active project management.

2. Document lessons learned from ATP's 16-year history to ensure that information will be preserved for future managers, policymakers, and researchers.

ATP employees were briefed on December 2, 2005 and informed of the situation. ATP and NIST have actively helped ATP employees transition to new opportunities. Many of the staff members who left the program have been able to find comparable positions elsewhere at NIST. Morale remains surprisingly good and the professionalism of the staff is laudable.

Since ATP began, the Economic Assessment Office has carefully documented the successes and failures of individual projects and tracked economic impact. A project to document the overall history of ATP was launched. A "history team" consisting of Chuck Bartholomew, Janet Brumby, Barbara Lambis, and Barbara Cuthill led this effort. Elements of this history include:

- The structural evolution of ATP;
- Focused programs;
- The role of industry;
- ATP's evaluation program; and;

- ATP project management methods and techniques.

ATP Deputy Director, Dr. Lorel Wisniewski, provided additional information on the phase-down effort. ATP operations will focus on three areas during the phase down:

- Project management: Approximately 200 projects were underway at the start of 2006, and will gradually run their course over the next two to three years. A small number will run until 2009. Project management will continue during the active life of the projects, followed by close-out and post-project requirements.

- Economic Assessment: The goal is to finish all assessment studies that are underway and find ways to preserve assessment data.

- Program Closeout: Archiving materials and closing out activities will require careful attention. Since project management files include proprietary information, one challenge will be to preserve non-proprietary data for future researchers while protecting proprietary information.

Another area of concern is the impact of ATP phase-out on NIST overhead and intramural funding. The loss of ATP means less overhead funding for NIST administrative functions, and less intramural funding for the NIST laboratories. Thus, the loss of ATP has adverse effects on other operating units within NIST. ATP is working with the NIST Budget Office to help NIST cope with these indirect impacts.

Good communication is deemed essential during this period. ATP management has let it be known that people may discuss freely the fact that they are exploring other job opportunities. NIST has been offering special classes in topics such as resume writing, and other NIST operating units are turning to ATP to fill job openings. ATP is striving to avoid a reduction in force action. It is desirable to avoid a situation where too many people bail out early, leaving the program with insufficient expertise, or the opposite situation, where everyone waits until the last minute to find another position, with the likely adverse impact on individuals who cannot quickly locate a new position. ATP wants to redirect staff resources as quickly as possible, but on the other hand, ATP must preserve sufficient expertise so that quality project management and other necessary activities can continue throughout the phase down. This will require frequent shifting of responsibilities.

Following this presentation, Dr. Armbrecht commended ATP and NIST for handling a difficult situation appropriately. A dialogue then took place between the committee and Dr. Jeffrey. The committee was profoundly disappointed about the decision to phase out the ATP. Dr. Jeffrey pointed out that the President proposes to increase NIST's budget for core activities under the American Competitiveness Initiative. This initiative emphasizes four areas:

1. High potential new technologies such as nanotechnology, quantum information technology, the hydrogen economy, and cyber security;

2. Near-term national needs such as international standards development, biometrics, and construction standards issues;

3. Increased utilization of important national scientific assets (NIST's Cold Neutron Research Facility and the Brookhaven National Synchrotron Light Source); and,

4. NIST facility upgrades, for example, improving building environmental conditions.

A brief discussion addressed whether the expertise and talent in ATP could be utilized in some other way. The Committee noted that a number of other countries have emulated ATP as a vehicle for stimulating economic growth and that the venture capital community is not funding high-risk research of the kind supported by ATP.

Dr. Armbrecht stated that he understood the situation, but that the Committee would have been remiss had its members not expressed their strong feelings about how valuable they feel the ATP has been and could continue to be.

Dr. Lewis Branscomb – Harvard University and the University of California at San Diego

Dr. Branscomb's topic was "Research Universities as Drivers of Science-Based Innovations." He began by commenting that he has gone on record as supporting the ATP, and that too often, critics of the program fail to recognize that it is a *research* program.

Links with universities are important to ATP. The role of research universities in the creation of high-tech innovation clusters is a topic that has recently been explored in some depth, and the findings are intriguing.

Almost all GDP growth is due to small but steady improvements in productivity and customer value of established goods and services. Nevertheless, science-based innovations are important.

San Diego, California, was cited by Dr. Branscomb as an example of a regional innovation cluster with which he is intimately familiar. Although many biotech firms in the San Diego area are currently unprofitable, their presence draws significant amounts of investment into the area, which contributes to economic growth. Larger established enterprises may not be innovative themselves, but they can buy innovations from smaller firms that are innovative, incorporate those innovations in widely distributed products and services, and thereby, contribute to GDP growth.

Branscomb believes the requirements for a successful high-tech regional cluster are:

- An "Honest Broker" (a research university may play this role);
- A creative, risk-tolerant culture;
- Sources of seed equity investment;
- Research institutions - creative, ambitious;
- A skilled resource base;
- Established industries, professions willing to help with the solution, not be the problem;

and;

- A place where there are "fun things to do."

Dr. Branscomb presented data gathered by the Association of University Technology Managers (AUTM), which show that invention disclosures and patent applications by universities rose substantially between 2001 and 2002. These and other data (such as the $1.3 billion in gross license income reported by universities in FY 2002) prove that intellectual property is an increasingly valuable asset for research universities. Other data show that new technology companies drawing upon academic discovery tend to spring up near universities, and universities are today often taking equity positions in new startups.

Research universities provide a region not only with experts in science and technology, but other expertise in related fields such as law, business management, and economics, that can also be valuable in fostering a high-tech innovation culture.

Data showing economic growth and infusion of venture capital in the San Diego area indicate dramatic growth during the 1990s. The University of California-San Diego involved real estate people and other community leaders in a cooperative endeavor called "CONNECT" to explore policies that would foster regional growth. This approach has been successful, as 120 start-up companies grew out of USCD. CONNECT was started by the university but is now an independent organization.

Nonprofit research organizations in the area, such as Scripps and Salk, also were catalysts for the creation of new research-based companies. Once a region reaches a certain critical mass of universities and/or other research organizations, the process of new firm creation accelerates. Venture capital firms also spring up in response to the growth of a high-tech cluster. Each region is different in its assets and culture, but to succeed in becoming a high-tech cluster, a region must have both world-class science and business savvy. To succeed, a region must know its assets, develop social networks among entrepreneurs, and build trust through collaboration.

Dr. Branscomb described how patent data can be used to identify "hot spots," that is, geographical areas where there are clusters of frequently-cited patents, indicating that firms in that area are on the cutting edge of technology. It appears possible to identify emerging areas that historically might not have been thought of as hotbeds of technical activity, but that appear likely to play an increasing role in the future. This is accomplished by tracking patents in particular categories. The first category is "hot patents" — patents that generated many derivative patents and are cited frequently by new patents. A second category is "next generation patents" — current patents building on hot patents.

Computer-generated maps displaying the density of these kinds of patents provide insight into technology clusters. As one would expect, there are major spikes in areas such as Silicon Valley and San Diego, California, and in the Boston, Massachusetts area. But there are other regions that account for more of these key patents than might be expected (Boise, Idaho, for example). By examining data for various years or periods, one can draw conclusions about which areas are becoming more successful as high-tech clusters and those that may be declining relative to the competition.

Fascinating correlations can be found by combining patent data with census data. For example, as might be expected, locations that were patent hot spots were highly correlated with the presence of nonprofit physical research organizations, management consulting firms, and patent lawyers. Such locations were somewhat negatively correlated with race tracks, religious bookstores, and correctional facilities. Examples of maps for particular areas were presented that showed the presence or absence of these kinds of correlations.

When the locations of ATP awardees are studied in conjunction with patent data, the evidence suggests that ATP awardees are pursuing high-risk, early-stage research and broadly enabling research, which indicates that ATP's selection criteria are being applied appropriately.

Overall findings suggest that only a few areas of the United States have excelled to date in becoming high-tech innovation clusters, but quite a few other areas are gaining ground. Once an area crosses a threshold and "gets going" there tends to be positive feedback. Differences within states are as great as differences between states. Technologies tend to migrate out from their starting point. Technological innovation tends to occur in mid-sized cities and urban peripheries rather than in traditional downtown urban areas.

More work remains to be done in analyzing such data and translating them into public policy recommendations. In particular, resolving the issue of the federal role in innovation vis-à-vis research universities deserves more attention.

Dr. Branscomb feels that each community must find and promote its unique assets. Today many communities seem to want to promote biotechnology or advanced materials, but there are other technology areas that may be more fruitful to pursue for a given community. Even niche technology areas can be worth pursuing.

San Diego had many assets to begin with, but a few individuals made a tremendous difference when they aggressively began to promote the area. Climate matters, and good schools matter, but individuals with leadership skills are particularly important. A community must also develop a culture of risk acceptance.

Areas that are in decline is a topic to which more attention should be devoted. The Route 28 area around Boston is not growing as fast as areas to its southwest. There is much going on today between Boston and New York City. After WWII, military spending in the Boston area contributed to much of its growth, but such spending has declined today.

Branscomb's analysis is only for the years 1998 and 2002. More analysis over a longer time period is needed to answer the question of whether ATP grants precede or follow growth in an area. ATP has gathered comprehensive data on the impacts of funded projects.

Branscomb commended ATP for its thorough economic analysis of all its projects.

Dr. Branscomb concluded by mentioning the example of a General Electric ATP project involving research on amorphous semiconductors to enable high resolution digital mammography. This project, which likely would not have occurred without ATP (or certainly not within the same time frame) was a great success, with important implications for healthcare. Critics of ATP often object to the funding of large companies, but Dr. Branscomb believes that this example demonstrates why that objection is invalid.

Mr. Franklin Vargo - Vice President, International Affairs, National Association of Manufacturers

Mr. Vargo spoke on the topic of U.S. Manufacturing Competitiveness in the Global Economy.

In spite of the erosion that has taken place, the United States is still the world's largest manufacturer. One concern is that during the 2002 through 2005 economic recovery, U.S. manufacturing output grew at a slower rate than in past recoveries. A major concern is that the U.S. has a huge and growing deficit in manufactured goods—nearly $600 billion in 2005, and the trend shows no signs of reversing.

Germany's manufacturing exports now exceed those of the United States, and China is expected to pass the U.S. soon. The U.S. share of global manufactured goods trade is decreasing. The contribution of exports to U.S. GDP growth fell from 2000 through 2005, and exports as a percentage of shipments show a downward trend overall. The domestic share of the U.S. market for manufactured goods is also on a downward trend.

Some have blamed the North American Free Trade Agreement (NAFTA) for causing the U.S. trade deficit problem, but according to Mr. Vargo, NAFTA actually represents a rather small fraction of the total trade deficit, and that fraction is comprised mostly of oil imports into the U.S. from Canada and Mexico. The U.S. manufactured goods trade with NAFTA countries performed much better than trade with the rest of the world. Mexico, for example, accounts for only four percent of the U.S. manufactured goods deficit. In fact, the U.S. manufactured goods deficit with Mexico has not grown in four years, although that U.S. deficit with the rest of the world soared. By far, China accounts for the largest portion of the worsening manufactured goods trade balance of the United States.

U.S. exports of advanced technology products have not done well recently relative to other types of exports, and are currently well below the trend line of the 1990s. In 2004, these exports were $140 million below the trend line.

Mr. Vargo believes that to boost U.S. manufacturing competitiveness, the following issues must be addressed:

- Corporate tax structure;
- Health and pension costs;
- Litigation costs;
- Regulatory compliance costs;
- Energy costs;
- Trade agreements and trade enforcement;
- Market-determined currencies; and;

- Development and dissemination of technology and innovation.

The value of the U.S. dollar relative to some other currencies is still high. Overhead costs and corporate tax rates of U.S. manufacturers, as well as the price of natural gas are all high relative to our global competitors. The number of U.S. engineering graduates is dropping while in many competing nations, the total is growing. Federal R&D funding for the physical sciences has been falling while R&D expenditures in competing nations are rising.

With regard to trade barriers, Vargo stated that offshore production in China by U.S. firms is mostly for Chinese consumption. Addressing trade barriers is certainly important to the United States. The World Trade Organization is the key to resolving these issues. China, India, and Brazil have high tariffs.

It is important to consider the actual content of imports and exports. For example, U.S.-made microelectronic devices may come back to the United States in products that are manufactured elsewhere.

In 2000 China became a major exporter. Comparing these data over a longer period is difficult because the U.S. has changed the way the data are classified.

Vargo was asked whether he foresees a tipping point where the U.S. will become less competitive relative to China and the European Union. He thinks there could well be a fork in the road in the next five years. The United States is running out of time, and unless the nation can overcome its trade problems, Congress may become more protectionist, and/or the dollar may collapse.

Mr. Vargo concluded with a plea for the nation to address these and other issues so that the United States can compete successfully in an increasingly sophisticated global marketplace.

Dr. Stephanie Shipp – Director, ATP Economic Assessment Office (EAO)

Dr. Shipp’s topic was "ATP's Legacy: Current and Future Research to Examine Collaboration."

Dr. Shipp began by saying that the phase-out of ATP has caused EAO to step up its efforts to document the program's legacy. ATP has shown that collaboration is an important factor in the success of ATP-funded projects.

Most ATP projects (86 percent) involve collaboration. By their very nature, joint venture projects involve collaboration, but even single-applicant ATP projects frequently involve collaboration.

Motivations for collaborating include:

- Pool resources to reduce cost;
- Share complementary R&D expertise;
- Gain knowledge from other organizations;

- Address a problem common to the industry; and;
- Access the commercialization capabilities of other firms.

The collaborations observed in the majority of ATP projects would not have occurred without ATP. ATP's involvement is key to fostering trust and cooperation among joint venture partners. Trust is established through face-to-face meetings. Once trust is established, collaboration can continue via phone calls and emails.

As the number of collaborators increases, more attention must be paid to managing the project and establishing and maintaining a high level of communication. Projects characterized by frequent communication have proved especially successful. Formal procedures for resolving disputes and protecting intellectual property must be established at the outset.

Joint venture projects tend to have more publications, patents, and early revenue streams relative to single-company projects. Collaboration with universities was deemed critical in roughly half of surveyed projects. Projects involving universities tended to experience more difficulties along the way, but tended to have more ambitious goals, and were more likely to succeed with respect to criteria such as publications and early revenue streams.

ATP awardees tend to continue collaborating after ATP projects end. Following an ATP award, companies tend to pursue higher risk projects with longer time frames, and they are more likely to collaborate.

Dr. Shipp described one highly successful ATP awardee, wTe Corporation. Its two projects "High Speed Identification and Sorting of Nonferrous Metal Scrap" and “Optoelectronic Sensing of Liquid Metal Composition" both promise to have important economic benefits as well as positive ecological impact. Factors contributing to the success of these two projects include:

- A charismatic leader;
- A science advisory board with academic and industry experts;
- University involvement;
- A clear need for the technology and clear goals;
- A team that follows the rules, but has freedom within the structure; and;
- Camaraderie among the participants.

A second example cited was the Abnormal Situation Management Consortium (ASMC). While the ATP project ended in 1998, collaboration among the participants continues.

ATP's research has shown that the most critical factors for the success of a collaborative effort include:

- Flexibility in approach and fluidity in membership;
- Importance of intangible benefits;
- A charismatic leader;
- An organizational champion; and;
- Suitable governance and decision-making practices.

Dr. Shipp then turned to the topic of preserving ATP's extensive data for future researchers. ATP's business reporting system has gathered a wealth of useful information. The challenge is to allow access to it by future researchers while protecting proprietary information. ATP is working with the National Technical Information Service and the National Archives Retrieval Administration to archive ATP reports. A Data Enclave is being created to allow research access to ATP’s Business Reporting System in a secure way.

Disseminating ATP's expertise is another important aspect of the phase-down process. ATP is working with state governments including Texas, California, and Maine to transfer evaluation know-how that could be useful to the states. ATP is a frequently-cited model for public-private partnerships, so sharing ATP's expertise as widely as possible in the time remaining is worth doing.

Unlike many other agencies, ATP evaluates all its projects. ATP will continue to produce status reports until the last project is finished. Texas is striving to produce a project rating system similar to that developed by ATP, and ATP staff have been working closely with their counterparts in Texas to teach them what ATP has learned.

Mr. Stanley commented that Lithuania has expressed great interest in ATP and through the U.S. State Department, he has engaged in a dialogue with Lithuanian officials to share information about how ATP operates.

January 30, 2007 Meeting

This was the first Committee meeting for new member Peter Cannon, a former vice president and chief scientist at Rockwell International.

Introductory Remarks

ATP Director, Marc Stanley, summarized the current status of ATP. The Commerce Department has been under a continuing resolution. ATP has been continuing the phase-down process. There are approximately 100 ongoing projects that ATP must continue to monitor, some of which will continue until 2009. ATP is also devoting considerable effort to documenting its operational processes as well as its accomplishments.

One ATP economic impact study showed that just 36 completed ATP projects produced $1.6 billion in benefits to the nation. Examples of highly successful companies that attribute much of their success to ATP include firms such as Cubic Video, Metabolix, Sun Power, and Curagen. For example, ATP awardee Sun Power (much smaller at the time it was funded by ATP), is now a $2 billion company, and says it would likely not exist without ATP’s support.

NIST Director Jeffrey has been conscientious about helping ATP staff seek other opportunities (for instance, providing career counseling), so as to avoid a reduction in force. Morale in ATP during this phase-down has remained surprisingly high thanks to the unusually strong commitment of the staff to the program.

Dr. Lorel Wisniewski, ATP Deputy Director, elaborated on the phase-down process. With no competitions underway, the remaining ATP staff members are devoting much of their time to managing remaining projects, archiving materials, and documenting the program's legacy. Forty percent of ATP's employees left during the past year, leaving 47. By the end of 2007, that number is projected to decline by another 40 percent.

Mr. Stanley noted that the governor of Texas and the legislature are enthusiastic about the potential of a new $200 million rapid innovation initiative to stimulate high tech development in the state in technical areas such as nanotechnology, by accelerating the transition of basic research toward commercialization. The University of Texas and Rice University are playing key roles. NIST and ATP have agreed to provide advice and work with state organizations.

The committee expressed enthusiasm about initiatives such as this, and wondered whether there might be opportunities for similar initiatives in other states.

Committee member John Byrd was asked to describe another promising new program. Professor David Patterson at the University of California-Berkley is leading an effort to improve digital data transfer among machine tools on the factory floor, and to develop a "WIFI"-type approach so that management can interrogate individual machines. Much work is needed to develop a standard that tool manufacturers and users can agree on.

NIST Chief Scientist, Hratch Semerjian, urged Byrd to encourage those involved in this effort to work with NIST. He pointed out that NIST's Automated Manufacturing Research Facility successfully addressed these kinds of issues; hence there is considerable expertise than can be brought to bear. Mr. Byrd knows Manufacturing Engineering Lab (MEL) Director Dale Hall, and said he will be in touch with him.

Julie Wolf-Rodda - Director of Partnership Development, Research Initiatives, for the Foundation for the National Institutes of Health

The Foundation for NIH is an independent IRS 501(c)(3) organization that was incorporated about a decade ago to raise private funds and establish public-private partnerships to support NIH's mission. Funds can be used to support research, education and training, and capital projects. About 90 percent of the Foundation's current projects are in the area of biomedical research. The Foundation provides a mechanism by which NIH and the private sector can work together for common goals. Its board of directors includes people from NIH, academia, and industry.

The Foundation serves as an honest broker and a forum for meaningful dialogue. Industry can make suggestions to NIH regarding how to increase the value of the research it funds, and the reverse. The Foundation can make decisions and get memoranda of understanding in place much more quickly than is typical in the federal government. It has more flexibility in creating innovative partnering arrangements than does a government agency

The Foundation can also reach out to international organizations, which is difficult for NIH. Given the nonfederal status of the Foundation, participants around the table can speak more freely. Consider a simple example: if a project is underway, and it turns out that more funds are needed, the Foundation can increase funding, whereas it would be difficult for NIH to do that for an ongoing project.

Ninety-seven percent of the funds raised by the Foundation supports programs, only three percent goes to administrative costs.

In some cases, NIH already has part of the money needed to respond to a particular challenge, and through the Foundation, seeks private sector funds to fill the gap. In a typical project, donors sign a letter of agreement with, and make a charitable contribution to, the Foundation. The Foundation then transfers the funds to NIH, via the conditional gift fund, and NIH program staff award the actual grants. In all cases, it is a very collaborative model, with the Foundation serving as the convener.

The most common funding arrangement is for private sector funds contributed to the Foundation to ultimately be combined with NIH-appropriated funds, then NIH issues grants, contracts, or cooperative agreements for the project area. A second possible arrangement is for private funds to be awarded by the Foundation to the recipient(s) in *parallel* with NIH funds. In a third model, private funds are issued by the Foundation as contract(s) or grant(s) directly, with NIH serving only in an advisory capacity.

Ms. Wolf-Rodda noted that there is always potential for collaboration to become limited to a narrowly focused group, but the Foundation seeks to get the word out broadly about potential projects, and not trust self-selection. This is intended to encourage serious collaboration. In some cases, patient advocacy groups are involved, which can further emphasize the importance of meaningful collaboration.

She presented a number of interesting examples of ongoing partnerships. The largest is a project to encourage research to prevent, treat, and cure diseases of the developing world, funded at the $200 million level by the Bill and Melinda Gates Foundation.

By encouraging the discovery, development, and quantification of biomarkers, the Foundation’s Biomarkers Consortium hopes to accelerate new approaches for preventing, diagnosing, and treating diseases. The consortium includes NIH, FDA, the Centers for Medicare and Medicaid Services, an impressive who’s-who list of major drug and biotech companies, plus a number of other organizations. Under the umbrella of this consortium, a number of projects are under development, in areas such as cancer, metabolic diseases, and neuroscience. When ideas for projects arrive, they are reviewed by the Executive Committee and then forwarded to the appropriate subject area steering committees for further development. Approved projects with identified private sector support can be fast-tracked. Those projects that require additional federal funds may take longer.

In the Foundation’s early years, the primary focus was on ensuring that sufficient funding was in place for its programs. As the organization has matured, and as its programs have begun to generate data, increasing attention is being paid to other types of outcomes. For instance, clinical trial data are starting to be released on some of the Foundation's oldest programs, and focus is now shifting to data generation timelines and the quality and usefulness of data. The Foundation is seeking to determine the effectiveness of its partnerships, and looking for best practices. NIH's Office of Public/Private Partnerships is assisting with this task.

At present the Foundation is not dealing with the issue of how to ensure commercialization of the research results. Instead, attention is focused on maximizing the outputs from the research.

NIST is already involved in working with NIH and the Foundation, for example, in the CT and X-ray imaging database collaboration. Both NIH and NIST are interested in nanotechnology, and NIH is investigating the health effects of nanoparticles. That is another area for possible NIH-NIST collaboration.

The committee was impressed with this partnership program, and agreed that the Foundation for NIH deserves wider publicity.

Chris Hayter - Program Director for Economic Development, National Governors Association

(Hayter was previously with NACFAM--The National Council for Advanced Manufacturing.)

Mr. Hayter described a landmark study of how manufacturers work with their suppliers to develop new products. Very little scholarly study has been devoted to supply chain integration and its impact on product development. The public policy implications need to be considered.

With the exception of the auto industry, American manufacturers have been doing better recently, and the U.S. output of goods is the highest ever. Productivity continues to increase.

The trend among U.S. manufacturers is towards "network-centric manufacturing," that is, where original equipment manufacturers (OEMs) increasingly outsource components to suppliers that are expected to exhibit innovation and add value, rather than just make parts per the drawings and specifications supplied by the OEM. Hayter described today's OEM as a "concert director." Purchasing managers are key corporate officials today, and decisions on suppliers are essential elements in overall corporate strategy.

The traditional linear product development process from research and planning to production ramp-up is increasingly being replaced by a more complex process involving iterative loops. The once-popular model of a comprehensive corporate research laboratory is falling out of favor because such laboratories in the past too often worked on projects disconnected from the manufacturing parts of the corporation. With current antitrust relaxation, OEMs can turn to other OEMs for new technology. Joint R&D ventures are more common today than ever before, and suppliers are likely to be at the table during the early stages of new product development. Supplier integration and trust are important. Purchasing agents no longer look for a supplier that can provide the cheapest nuts and bolts on a one-time basis, but rather for strategic partner suppliers that can add the most value for the long term. Although most companies have not moved completely to this new paradigm, the trend is definitely in this direction.

The study that Hayter reported on was based on interviews with key personnel at many of America's most successful companies, and with academic experts. Two in-depth case studies were carried out—Lockheed-Martin's advanced development "skunk works" and Boeing's development of the 787 aircraft. Hayter spent considerable time describing Boeing's experience.

Boeing was being challenged by Airbus, and originally began to design a radically new aircraft to fly at speeds approaching mach 1, but particularly after 9/11, U.S. airlines became concerned with cost reductions rather than speed. So in designing the 787, Boeing emphasized light weight, reduced life cycle costs, and lessened environmental impact. Projections are that the 787 will have 20 percent reductions in weight and fuel consumption and 30 percent lower maintenance costs.

Because the 787 uses carbon fiber composites extensively, Boeing licensed technology from a company with expertise in carbon fiber composites—North Sails Group. In addition, Boeing partnered with a number of companies from around the world (for example, Australia, Japan, and Italy) to further develop the technology and manufacturing techniques. Suppliers were selected to be firms committed to working with Boeing to provide innovation and a modular approach, such that individual modules (for example, avionics modules) can be upgraded as new, improved versions become available.

One result of the innovative new approaches to manufacturing developed by Boeing is that assembly time has dropped dramatically. Projections suggest that the 787 can be assembled in only 3 days!

A company such as Boeing may not do all of the design work for a new aircraft. Boeing sometimes relies on others for module designs. "Extreme" collaboration is required for this joint design work to be successful. Boeing and its strategic suppliers must also work together to ensure that the views of the airlines and their passengers are incorporated into the final design.

Mr. Hayter noted that each industry is different, and solutions need to be industry-specific. The semiconductor industry stepped up to the challenge some years ago, with help from the national defense community, by creating industry roadmaps and forming Sematech. One must understand the differences between industries so that policies can reflect those differences.

Another issue that the nation needs to examine is the role of post-secondary education in the knowledge economy. An opportunity exists for states and universities to work together more closely to examine and answer this question. States and universities can take advantage of their flexibility, relative to the federal government. For example, after a meeting of state policy advisors introducing new ideas about innovation developed in Arizona, representatives from Hawaii went back and quickly helped craft innovation legislation that they will soon release.

The Committee felt that the shared innovation model is a good one. Technical knowledge resides in domestic suppliers as well as international ones. The NGA can help by encouraging the development of technology clusters in the U.S.

Mr. Hayter believes the United States needs to encourage *innovation* development strategies rather than less effective economic development strategies (such as states competing with each other via tax incentives to lure industry). States need to look upon public policy as a roadmap and encourage technology clusters.

A challenge to the nation is to adopt public policies that will encourage collaboration and networking, for example, programs to assist small manufacturers in becoming more innovative.

In summary, OEMs operate in an increasingly competitive environment in which outsourcing is commonplace. New products rely on innovation by suppliers rather than just low cost, and therefore supply chain management is crucial.

The Committee felt that it would be good for the Congress to hear this presentation.

Dr. Robin Gaster – Innovation Ecologies, Inc.

Dr. Gaster’s company, Innovation Ecologies, Inc., has developed sophisticated databases and associated analytic software to enable comparisons of the innovative capacity of different regions or states. Initially the emphasis has been on states, but that will be expanded soon to cover metro areas and counties. Information comes from a variety our sources, including 30 federal agencies (for example, Census, Bureau of Labor Statistics, Department of Defense, National Science Foundation, and others), private companies, and other sources. ATP helped to fund this development, and the results are available online to interested parties.

The goal was to make the user interfaces as simple as possible. The presentation demonstrated what has been accomplished. One can select a particular state, and choose the other states to be included in the comparison. With graphical tools and color coding, it is easy to grasp the nature of the comparisons.

The knowledge category includes elements such as patents, trademarks, and eventually, scientific publications. Other categories cover factors such as jobs, firm creation, and environmental impact. Summary reports show strengths and weaknesses of the selected state relative to the other states included in the comparison. One can compare a state to contiguous states or to states in other parts of the nation, examining factors such as Internet access, universities, labor and capital availability, and even quality of life.

By starting at the summary (highest aggregation) level, the observer can see at an overall level how that state stacks up to the others included in the comparison. The user can delve into the details, down to the metric level, where one can observe data on individual factors, for example, number of life scientists employed in the state. At any time, the user can request the lower level raw data, such as number of employed engineers, or stay with the more aggregated comparisons.

Datasets are generally from public sources, such as census data, information from the Bureau of Labor Statistics, the Department of Education, and even information about factors such as SBIR and ATP awards. If multiple datasets are incorporated, then even if one dataset turns out to be inaccurate, the overall conclusions will likely still be valid.

Trend graphs and rates of change data are also available, showing for example, growth or decline in number of engineers in the state by year. Users can export data to Excel spreadsheets, where the data can then be manipulated and customized by the user in ways other than those provided for in the standard analysis tools.

Natural language search capabilities help the user find information easily. A keyword search might turn up imbedded datasets, the existence of which the user was not ever aware. Changes can be made on the fly. If the user were comparing Maryland to, say, Delaware, Pennsylvania, and Virginia, and wondered how the findings would change if West Virginia were substituted for Delaware, it is easy of make that sort of change.

Besides the ongoing effort to extend the model to metro areas and counties, additional datasets will be added. More user tools will be added, such as the ability to weight factors differently at the discretion of the user. The public can explore the current version and future versions by going to the company's website:

www.innovationecologies.com

A governor should find it extremely helpful to see how his or her state stacks up against other states with respect to a wide variety of indicators. The data can help in setting priorities for state programs. The Committee feels that ATP has benefited the technology policy community by funding this work.

The Committee was impressed with the results that are currently available and hopes that this work will continue. Dr. Gaster noted that his company intends to make it possible for users to combine their own private data with the data in the system, and to provide feedback regarding the usefulness of the system.

Appendix 1

Reports and Journal Articles Published by the Advanced Technology Program since October 2005.

Pelsoci, Thomas, *ATP Funded Green Process Technologies: Improving U.S. Industrial Competitiveness with Applications in Packaging, Metals Recycling, Energy, and Water Treatment—A Benefit-Cost Study*, GCR 06-897, February 2007.

O'Connor, Rowe, Gallaher, Sevinsky, and Wood, *Economic Impact of ATP's Contributions to DNA Diagnostics Technologies*, GCR 06-898, January 2007.

Bischoff, Douglas, Mrunal Chapekar, Barbara Cuthill, Michael Schen, Linda Beth Schilling, and Michael Walsh, *A Summary of ATP-Funded Innovations for America's Aging Population*, January 2007.

Watkins and Schlie, Direct and Spillover Effects of ATP-Funded Photonics Technologies, GCR-06-893, December 2006

Kerwin, Brick, Levin, O'Brien, and Cantor, *Surveying R&D Professionals by Web and Mail: An Experiment*, GCR 06-904, December 2006.

Brodd, Factors Affecting U.S. Production Decisions: *Why Are There No Volume Lithium-Ion Battery Manufacturers in the United States?*, GCR 06-903, December 2006.

The Network-Centric Innovation Imperative: *How Manufacturers Work With Their Suppliers to Develop New Products*, National Council for Advanced Manufacturing, Fall 2006.

Gaster, Robin, Regional Innovation Index™, October 2006.

Fogarty, Michael S., Amit K. Sinha, and Adam B. Jaffee, *ATP and the U.S. Innovation System: A Methodology for Identifying Enabling R&D Spillover Networks*, GCR 06-895, October 2006.

Petrick, Irene J., Ann E. Echols, Susan Mohammed, and Jesse Hedge, *Sustainable Collatoration: A Study of the Dynamics of Consortia*, GCR 06-888, August 2006.

Dyer, Jeffrey H., Benjamin C. Powell, Mariko Sakakibara, and Andrew J. Wang, *Determinants of Success in R&D Alliances*, NISTIR 7323, August 2006.

O'Brien, Jennifer, Andrew Wang, Stephanie Shipp, and Kathleen McTigue, *Findings from the Advanced Technology Program's Survey of Joint Ventures,* GCR 06-889, July 2006.

Powell, Jeanne, *Toward a Standard Benefit-Cost Methodology for Publicly Funded Science and Technology Programs*, NISTIR 7319, June 2006.

Mazumdar, Purabi and David Swanson, *COMPETING FOR THE FUTURE: A Historical Review of NIST ATP Investments in Semiconductor and Micro/Nano-Electronics*, June 2006.

White, Grady S. and Kris A. Bertness, *Trends and Opportunities in Photonics Technologies: Solid-State Lighting and Healthcare*, NISTIR 7305, May 2006.

COMPETING FOR THE FUTURE: A Historical Review of NIST ATP Investments in Photonics and Optical Technologies, May 2006.

FEDERAL FUNDING FOR TECHNOLOGICAL REVOLUTIONS: Biotechnology and Healthcare Highlights, April 2006.

Shipp, Stephanie, Andrew Wang, Stephen Campbell, and Lorel Wisniewski (NIST) and Kerry Levin, and Jennifer O'Brien (Westat), "Measuring Behavior Additionality in ATP Joint Venture Projects: Findings from the Advanced Technology Program," *Government R&D Funding and Company Behavior, Measuring Behavior Additionality*, Organisation for Economic Co-Operation and Development (OECD), 2006

Ruegg, Rosalie, Bridging from Project Case Study to Portfolio Analysis in a Public R&D Program: *A Framework for Evaluation and Introduction to a Composite Performance Rating System*, NIST GCR 06-891, April 2006.

Nail, John and Hayden Brown, *Identifying Technology Flows and Spillovers Through NAICS Coding of ATP Project Participants*, NISTIR 7280, April 2006.

Performance of Second 50 Completed ATP Projects: Status Report - Number 3, U.S. Government Printing Office, Washington, D.C, January 2006.

Appendix 2

ATP Gems and Success Stories

ATP Helps Consortium Develop Technology to Prevent Manufacturing Accidents, *Abnormal Abnormal Situation Management Consortium* (ASMC), (Honeywell, Inc., Minneapolis, MN – consortium organizational leader; seven large petrochemical firms: BP; Amoco; Chevron; Exxon; Mobil; Shell; Texaco; and two small software suppliers: Applied Training Resources, Houston, TX; Gensym, Cambridge, MA)

Security Framework to Exchange Data That Enhances Productivity, Advanced Micro Devices, Inc., Sunnyvale, CA; ILS Technology LLC, Boca Raton, FL; and Oceana Sensor Technologies Inc., Virginia Beach, VA

Worlds First Commercial Production Facility for High-Temperature Superconducting Wire, *American Superconductor Corporation*, Westborough, MA

American Auto Companies Form Consortium to Develop Structural Composites for Large Parts, Automotive Composites Consortium (ACC), Dearborn, MI

Balancer Saves Industry Time and Money, *BalaDyne Corporation*, Ann Arbor, MI

Coating-Enabled Component Design: Technology Tools for Nanostructures Coatings, *Caterpillar, Inc.*, Peoria, IL; *United Technologies Corp.*, East Hartford, CT; and *J.A. Woollam Co.*, Lincoln, NE

ATP Helps Advance Testing Security in E-commerce, *Cigital, Inc.*, Dulles, VA

Advanced Optimization Technology to Enhance Business Decision Making, *CombineNet, Inc.*, Pittsburgh, PA

Palm Pilot Uses Partially ATP-Enabled Handwriting Recognition Technology, *Communication Intelligence Corporation*, Redwood Shore, CA

Good Digital Images Improve Surveillance, *Cubic VideoComm, Inc.*, San Diego, CA

ATP Helps Develop Technology to Design Protein-specific Drugs, *CuraGen Corporation*, Branford, CT, *American Home Products Corporation*, Pearl River, NY, *Pennsylvania State University*, State College, PA

ATP Helps Process to Manufacture the Next Generation Liquid Crystal Display (LCD) Chips, *Displaytech, Inc.*, Longmont, CO

One-step Purification of Natural Gas, *Engelhard Corporation*, Iselin, NJ

Highly Efficient Solar Cells, *Evergreen Solar, Inc.* , Marlboro MA

ATP Helps Develop Flow-Control Machining to Increase Fuel Economy, *Extrude Hone Corporation*, Irwin, PA; *Ford Motor Company*, Dearborn, MI;, *General Motors*, Detroit, MI;

University of Nebraska, Lincoln, NE; *University of Pittsburgh*, Pittsburgh, PA; *Roush Industries*, Livonia, MI; *CMI Castings*, Southfield, MI; *Alcoa*, Pittsburgh, PA

Start-up Company Commercializes Novel Plastics Technology, *Ford Motor Company*, Dearborn, MI and *General Electric Research and Development*, Schenectady, NY

Low-Cost Amorphous Silicon Manufacturing for Digital Mamography and Other Uses, *General Electric Global Research*, Schenectady, NY and *Perkin Elmer*, Boxborough, MA

High-Performance NanoMaterials, Hybrid Plastics, Inc., Hattiesburg, MS

Kent SeaTech Increases Fish Farm Yield and Recycles Water for Neighboring Agricultural Irrigation, *Kent SeaTech Corporation*, San Diego, CA

Software to Develop Cognitive Skills, *Lexia Learning Systems, Inc.*, Lincoln, MA

Fiber-Optic Sensors to Monitor Deepwater Oil and Gas Pipelines, *Luna Innovations, Incorporated*, Blacksburg, VA

Extended Portable Power Through Innovative Integration of Energy Technologies, *MTI Microfuel Cells, Inc.*, Albany, NY

High-performance, Biodegradable Plastics that are Renewable and Eco-friendly, *Metabolix, Inc.*, Cambridge, MA 02139

World's First Corn-to-Plastics Plant Opens, *NatureWorks LLC*, Wayzata MN

ATP helps to develop Field Emission Display Technology To Demonstrate High Definition Television, *Nano-Proprietary, Inc.* (formerly SI Diamond), Austin, TX, *Supertex*, Sunnyvale, CA

High Temperature Imaging System to Improve Process Inspection, *OG Technologies, Inc.*, Ann Arbor, MI

Web-Based Technologies that Drastically Change Industrial Product Design, *Ohio Aerospace Institute* (project lead)

Integrated Microfabricated Devices for DNA Typing, *Orchid Biosciences, Inc.*, Princeton , NJ

Holographic Diffusers that Can Efficiently and Cost Effectively *, Physical Optics Corporation*, Torrance CA

ATP Helps Develop the World's Smallest Rechargeable Polymer Battery for Use in Neurostimulation, *Quallion LLC*, Sylmar, CA (project Lead)

ATP Helps to Simplify and Reduce Software Maintenance and Upgrade Costs, *Semantic Designs, Inc.*, Austin, TX

ATP Helps Develop the World's Most Efficient Solar Panels, *SunPower Corporation*, Sunnyvale, CA

Model Driven Intelligent Control of Manufacturing, *STEP Tools, Inc.*, Albany, NY

Generic Technologies for the Targeted Detection and Cleavage of DNA and RNA, *Third Wave Technologies, Inc.*, Madison, WI

First Commercial Heterogeneous Catalyst Developed Using High Throughput Discovery Techniques, *UOP LLC*, Des Plaines, IL and *Novodynamics, Inc.*, Ann Arbor MI

High-speed Sorting To Recycle Scrap Metal, wTe Corporation, Bedford, MA and National Recovery Technologies Inc., Nashville, TN

Innovative Optics Technology to Focus X-Rays and Neutrons *, X-ray Optical Systems*, Albany, NY

Appendix 3

Status Reports Completed since October 2005

95-08-0012: Abbott Laboratories (formerly Vysis, Inc.) (Biotechnology); Star Rating: 0; Published 10/26/2005.

94-05-0006: GeneTrace Systems, Inc. (Biotechnology); Star Rating: 3; Published 12/9/2005.

95-01-0177: Johnson & Johnson Pharmaceutical Research and Development, L.L.C. (formerly 3-Dimensional Pharmaceuticals, Inc.) (Biotechnology); Star Rating: 1; Published 1/4/2006.

93-01-0151: IBM Corporation, T. J. Watson Research Center (Electronics/Computer Hardware/Communications); Star Rating: 1; Published 1/4/2006.

93-01-0094: BioHybrid Technologies, Inc. (Biotechnology); Star Rating: 2; Published 3/16/2006.

95-08-0016: Sangamo BioSciences, Inc. (Biotechnology); Star Rating: 2; Published 3/24/2006.

95-03-0023: LOTS Technology (Electronics/Computer Hardware/Communications); Star Rating: 0; Published 3/30/2006.

93-01-0244: National Center for Manufacturing Sciences, Inc. (Manufacturing); Star Rating: 3; Published 6/9/2006.

95-06-0022: Copeland Corporation (Manufacturing); Star Rating: 0; Published 6/9/2006.

94-01-0282: Nano-Proprietary Inc (formerly SI Diamond) (Electronics/Computer Hardware/Communications); Star Rating: 4; Published 7/5/2006.

94-01-0404: CuraGen Corporation (Biotechnology); Star Rating: 4; Published 7/27/2006.

95-01-0098: Message Pharmaceuticals, Inc. (formerly Symphony Pharmaceuticals) (Biotechnology); Star Rating: 0; Published 8/7/2006.

95-04-0029: Telcordia (formerly Bell Communications Research, Inc.) (Information Technology); Star Rating: 0; Published 8/7/2006.

95-10-0008: Misys Healthcare Systems (formerly Sunquest Information Systems) (Information Technology); Star Rating: 2; Published 8/30/2006.

95-04-0008: SYS Technologies (formerly Cubic Defense Systems, Inc.) (Information Technology); Star Rating: 4; Published 8/30/2006.

94-01-0079: Caterpillar, Inc. (Advanced Materials and Chemicals); Star Rating: 2; Published 9/13/2006.

95-02-0058: Extrude Hone Corporation (Manufacturing); Star Rating: 4; Published 10/11/2006.

94-06-0007: Aesthetic Solutions, Inc. (Information Technology); Star Rating: 0; Published 10/18/2006.

95-09-0021: Cigital (formerly Reliable Software Technologies) (Information Technology); Star Rating: 2; Published 10/18/2006.

97-06-0005: Cigital, Inc. (formerly Reliable Software Technologies) (Information Technology); Star Rating: 4; Published 10/18/2006.

98-04-0007: Physical Optics Corporation (Information Technology); Star Rating: 3; Published 11/29/2006.

95-09-0059: Semantic Designs, Inc. (Information Technology); Star Rating: 4; Published 11/29/2006.

94-01-0169: Honeywell, Inc. (Advanced Materials and Chemicals); Star Rating: 4; Published 11/29/2006.

98-01-0097: Ebert Composites Corporation (Advanced Materials and Chemicals); Star Rating: 3; Published 2/15/2007.

95-01-0150: Air Products and Chemicals, Inc. (Manufacturing); Star Rating: 2; Published 2/15/2007.

99-01-6041: BASF Catalysts LLC (formerly Engelhard Corporation) (Advanced Materials and Chemicals); Star Rating: 4; Published 2/22/2007.

97-01-0244: Physical Optics Corporation (Electronics/Computer Hardware/Communications); Star Rating: 3; Published 3/8/2007.

98-01-0059: Hybrid Plastics, Inc. (Advanced Materials and Chemicals); Star Rating: 4; Published 3/16/2007.

97-06-0038: L3 Communications (formerly Intermetrics, Inc.) (Information Technology); Star Rating: 2; Published 3/16/2007.

98-03-0050: Maxwell Technologies (formerly Maxwell Energy Products, Inc.) (Advanced Materials and Chemicals); Star Rating: 3; Published 3/21/2007.

97-02-0055: ExOne Company (formerly Extrude Hone Corporation) (Manufacturing); Star Rating: 4; Published 3/21/2007.

About the Advanced Technology Program

The Advanced Technology Program (ATP) bridges the gap between the laboratory and the market place through research partnerships with the private sector. ATP's early stage investments accelerate the development of new products and processes containing enabling technologies that private investors consider too risky. ATP changes the way U.S. industries approach high-risk research by providing a mechanism for industry to extend its technological reach and push out the envelope of what can be attempted.

ATP views R&D projects from a broad perspective. In sharing the relatively high risks of developing technologies that could enable a broad range of new commercial opportunities, ATP fosters projects with a high pay-off for the nation as a whole – in addition to a direct return to the innovators.

ATP has several features that set it apart from other government R&D programs:

- For-profit companies conceive, propose, and execute ATP projects, often in alliance with other companies, academia, not-for-profit organizations, and federal labs. All industries and all fields of science and technology are eligible for funding. For-profit companies retain rights to all intellectual property developed in a project.
- The ATP award is a cost-share cooperative agreement. Joint Ventures (two or more for-profit companies sharing research responsibilities) pay at least half of all project costs. Large, *Fortune 500* companies participating as a single applicant must pay at least 60 percent of total project costs. Small and medium-sized companies, as single-company applicants, must pay a minimum of all indirect costs associated with the project.
- ATP does not fund basic research or product development.
- ATP awards are made strictly on the basis of rigorous peer-reviewed competitions. Selection is based on scientific and technological merit, and strong potential for broad-based economic benefits to the nation. All proposals are assured a confidential, technically competent review even if they involve a broad, multi-disciplinary mix of technologies.
- ATP's support does not become a perpetual subsidy or entitlement – each project has goals, specific funding allocations, and completion dates established at project initiation. Projects are monitored and can be terminated either for cause or by mutual consent before completion.
- Sixty-six percent of ATP awards have gone to small businesses or to joint ventures led by a small business. Of the projects selected for awards since the inception of ATP in 1990, well over half of the projects include one or more universities as either subcontractors or joint-venture members.

For more information, or to be put on the ATP mailing list:

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